PATENT ABSTRACTS OF JAPAN

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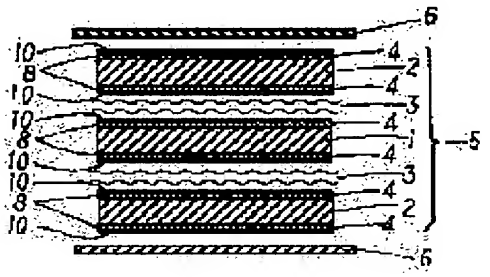
(54) MANUFACTURE OF MULTILAYER BOARD

(57)Abstract:
PURPOSE: To manufacture a multilayer board easily and efficiently by a method wherein inner-layer and outer-layer core materials wit their surfaces being oxidized are stacked through prepregs and then the stacked body is put between mirror plates and then is formed by heating and pressing.
CONSTITUTION: A prepreg 3 is made by a method wherein glass-fiber base is impregnated with epoxy resin and is dried until the resin is half-hardened. Two pieces of such prepregs 3 are stacked. On both sides of the stacked body, single-sided roughly-processed copper foils 8 are placed. And then, the stacked body is placed between a pair of heating plates and then are heated and pressed to be made into a double-sided copper clad laminate. This laminate is etched and then a wiring pattern 4 is formed. After that, the laminate is blackened and thereby an oxidized face 10 is formed. By this method, an inner-layer core material 1 and an outer-layer core material 2 are formed. A plurality of the prepregs 3 are stacked both on and under the inner-layer core material 1 and then the outer-layer core materials 2 are stacked outside the inner-layer core material 1, to obtain a pressed body 5. The pressed body 5 is put between a pair of mirror plates 6. A plurality of pairs of the pressed bodies 5 are placed between a pair of heating plates and then are formed by heating and pressing to be made into a six-layer multilayer board. By this method, the inner-layer and the outer- layer core material can be manufactured easily and thereby a productivity can be increased.



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CLAIMS

[Claim(s)]
[Claim 1] The manufacture approach of the multilayer board characterized by to form a inner layer circuit, the inner layer core material 1 which oxidized the becoming circuit pattern 4, and the outer layer core material 2 which oxidized the surface circuit pattern 4, to use the outer layer core material 2 as a pressed object 5 in piles through the prepreg 3 of this inner layer core material 1 which sank the resin varnish into the base material up and down, to pinch and carry out heating pressing of this pressed object 5 with the mirror plane plate 6, and to form a multilayer board.
[Claim 2] The manufacture approach of the multilayer board characterized by inserting and carrying out heating pressing of the cover sheet 7 between a pressed object 5 and the mirror plane plate 6 in the case of the heating pressing of the claim 1 above-mentioned publication.
[Claim 3] The manufacture approach of the multilayer board characterized by the cover sheet 7 of the claim 2 above-mentioned publication allotting and carrying out heating pressing of the roughening side to the side which faces a pressed object 5 by copper foil.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the manufacture approach of the multilayer board which used inner layer core material and outer layer core material.
[0002]
[Description of the Prior Art] Conventionally, the demand concerning board thickness, such as impedance control and outermost insulation thickness tolerance, in a multilayer board is severe. Therefore, in case multilayering is attained, the manufacture approach of a multilayer board of securing the precision of board thickness as one approach for obtaining desired board thickness using more core material has been performed.
[0003] There were some which have the lamination shown in drawing 3 as the manufacture approach of this multilayer board. This drawing 2 is the sectional view showing the lamination for explaining the manufacture approach of the multilayer board which consists of six conventional layers. The manufacture approach of the conventional multilayer board is explained using this drawing.
[0004] First, each predetermined pattern, such as a signal plane pattern, a voltage plane pattern, and a grand pattern, is formed for example, in double-sided copper clad laminate, and the inner layer core material 1 is formed. Moreover, the predetermined circuit patterns 4, such as a signal plane pattern, a voltage plane pattern, and a grand pattern, are formed in one side of double-sided copper clad laminate, and the outer layer core material 2 is formed.
[0005] Next, up and down, while putting the prepreg 3 which sank in resin varnishes, such as an epoxy resin, the number of necessary sheets on base materials, such as a glass fabric, the outer layer core material 2 was put on the both sides, and the multilayer board has been obtained by [of the inner layer core material 1 by which the circuit pattern 4 was formed in the above-mentioned table flesh side] carrying out heating pressing of this.
[0006] In the manufacture approach of this multilayer board, although one side roughening copper foil 8 is used, in order to raise bond strength with prepreg 3, the inner layer core material 1 forms the oxidation-treatment side 10 for the front face in which the circuit pattern 4 of this one side roughening copper foil 8 was formed by oxidation treatment, and is roughening the front face. Moreover, the outer layer core material 2 uses one side roughening coppe copper foil 8 for the copper foil used as the outermost layer, and in order to raise bond strength with prepreg 3 to the inner layer core material 1 side, it is using double-sided roughening copper foil 9.
[0007] However, this double-sided roughening copper foil 9 had high cost compared with one side roughening copper foil 8, and since protection processing of the front face was not carried out, it had required time and effort for handling. That is, this roughening side was carrying out pickling which removes a surface oxide at the time of a lamination and circuit formation in order to tend to oxidize compared with a glossy surface.
[0008]
[Problem(s) to be Solved by the Invention] The place which this invention was made in view of the above-mentioned problem, and is made into the purpose is to offer the manufacture approach of a multilayer board that a multilayer board can be manufactured easily and efficiently using inner layer core material and outer layer core material.
[0009]
[Means for Solving the Problem] The manufacture approach of the multilayer board concerning claim 1 of this invention is characterized by using the outer layer core material 2 oxidized by the base material up and down through the prepreg 3 of the oxidized inner layer core material 1 which sank in the resin varnish as a pressed object 5 in piles, inserting this pressed object 5 between the mirror plane plates 6, carrying out heating pressing, and forming a multilayer board.
[0010] Moreover, the manufacture approach of the multilayer board concerning claim 2 of this invention is characterized by inserting and carrying out heating pressing of the cover sheet 7 between a pressed object 5 and the mirror plane plate 6 in the case of the heating pressing of above-mentioned claim 1.
[0011] Moreover, it is characterized by the manufacture approach of the multilayer board concerning claim 3 of this invention allotting and carrying out heating pressing of the roughening side to the side which the cover sheet 7 used by above-mentioned claim 2 is copper foil, and faces a pressed object 5.
[0012]
[Function] Since according to the manufacture approach of the multilayer board concerning this invention pile up the inner layer core material and outer layer core material which oxidized the front face and were obtained through prepreg, and it considers as a pressed object, and this pressed object is inserted between mirror plane plates, carries out heating pressing and a multilayer board is formed, copper foil of the same kind can be stuck on the front face of

core material, and inner layer core material and outer layer core material can be formed at the same processing process. Moreover, since heating pressing of the above-mentioned pressed object is carried out, inner layer core material and outer layer core material can be formed similarly.
[0013] Moreover, adhesion in the outermost layer of the resin powder which disperses from the end face of prepreg or core material can be prevented by inserting a cover sheet between a pressed object and a mirror plane plate in the case of heating pressing. The metallic foil in which that this cover sheet excelled [that] in thermal resistance was formed with the ** form sheet which was used and was formed by resin, such as triacetate resin and the Pori polyvinyl fluoride, or copper, aluminum, etc. is used.
[0014] Moreover, when the above-mentioned cover sheet allots and carries out heating pressing of the roughening side to the side which faces a pressed object by copper foil, the resin which flowed out from prepreg by heating pressing can adhere to the roughening side of this copper foil, and can unify a multilayer board and copper foil.
[0015] The outer layer core material used by this invention can be obtained by being formed like the approach of forming inner layer core material, carrying out etching processing of superposition and its front face of the laminate obtained by allotting copper foil up and down and carrying out heating pressing for the prepreg of necessary number of sheets, and forming a circuit. Furthermore, it can be used as an ingredient of a multilayer board by oxidizing the copper foil of the front face of this laminate.
[0016] The one side roughening copper foil of electrolytic copper foil is used for the above-mentioned copper foil, and in case core material is formed, a roughening side is allotted to the field which counters prepreg, a glossy surface is allotted outside, and it is stuck.
[0017] Moreover, as the above-mentioned oxidation treatment, chemical treatments, such as brown oxide processing and black oxide processing (melanism processing), are performed. What is allotted to the outermost layer of a multilayer board since that by which the oxidation-treatment side formed by this oxidation treatment is formed in the field which faces the prepreg of inner layer core material and outer layer core material increases bond strength with prepreg is removed after forming a multilayer board.
[0018] Hereafter, this invention is explained to a detail about one example.
[0019]
[Example]
An epoxy resin is sunk into the base material (Nittobo [Co., Ltd.] make: WEA116E) of a glass fabric with an example 1 thickness of 100 micrometers. Two prepregs 3 in which were dried and resin carried out semi-hardening are piled up. Further 70-micrometer one side roughening copper foil 8 is laid on top of the both sides, and it inserts between mirror plane plates, and allots between the heating plates of a pair, and they are the temperature of 180 degrees C, and the pressure of 40kg/cm2. Heating pressurization was carried out for 90 minutes, and double-sided copper clad laminate with a thickness of 0.2mm was obtained.
[0020] furthermore, this double-sided copper clad laminate -- etching processing -- giving -- the circuit pattern 4 -- forming -- this circuit pattern 4 -- melanism -- it processed, the oxidation-treatment side 10 was formed, and the inner layer core material 1 and the outer layer core material 2 were formed.
[0021] As shown in drawing 1 , the above-mentioned prepreg 3 with a thickness of 0.15mm to the upper and lower sides of the obtained inner layer core material 1 And two or more sheet pile, Furthermore, insert the pressed object 5 which laid the outer layer core material 2 on top of that outside, respectively between the mirror plane plates 6 which accomplish a pair, and two or more sets of the pressed object 5 pinched with the mirror plane plate 6 which accomplishes this pair are inserted between the heating plates of a pair. For the temperature of 170 degrees C, and 80 minutes, and pressure of 5kg/cm2 The impression during 5 minutes, and pressure of 40kg/cm2 It impressed for 75 minutes, heating pressing was performed, and the multilayer board of six layers was obtained.
[0022] the example 2 above-mentioned example 1 -- the same -- carrying out -- double-sided copper clad laminate formation -- carrying out -- further -- this double-sided copper clad laminate -- etching processing -- giving -- the circuit pattern 4 -- forming -- this circuit pattern 4 -- melanism -- it processed, the oxidation-treatment side 10 was formed, and the inner layer core material 1 and the outer layer core material 2 were formed.
[0023] As shown in drawing 2 , the above-mentioned prepreg 3 with a thickness of 0.15mm to the upper and lower sides of the obtained inner layer core material 1 And two or more sheet pile, Furthermore, the pressed object 5 which laid the outer layer core material 2 on top of the outside, respectively is formed. Insert covering copper foil 7a up and down between the superposition and the mirror plane plates 6 which accomplish a pair of this pressed object 5, and two or more sets of the pressed object 5 pinched with the mirror plane plate 6 which accomplishes this pair are inserted between the heating plates of a pair. They are impression and the pressure of 40kg/cm2 for 5 minutes for the temperature of 170 degrees C, and 80 minutes, and at the pressure of 5kg/cm2. It impressed for 75 minutes, heating pressing was performed, and the multilayer board of six layers was obtained.
[0024] the circuit pattern 4 which formed double-sided copper clad laminate with a thickness of 0.2mm, performed etching processing to this double-sided copper clad laminate like example of comparison 1 example 1, and was further formed by etching processing -- melanism -- the inner layer core material 1 which processes and has the oxidation-treatment side 10 in a signal circuit and a power circuit, and a grounded circuit was formed.
[0025] Moreover, prepreg 3 is laid on top of one [two sheet superposition and] field, 70-micrometer double-sided roughening copper foil 9 is laid on top of the field of 70-micrometer one side roughening copper foil 8 and another side, and it inserts between the mirror plane plates 6, and allots between the heating plates of a pair, and they are the temperature of 180 degrees C, and the pressure of 40kg/cm2. Heating pressurization was carried out for 90 minutes, and double-sided copper clad laminate with a thickness of 0.2mm was obtained.

[0026] And as shown in drawing 3 , two or more sheet pile and the pressed object 5 which laid the outer layer core material 2 on top of the outside, respectively were further formed in the upper and lower sides of the obtained inner layer core material 1 for the above-mentioned prepreg 3 with a thickness of 0.15mm. This outer layer core material 2 makes the field on which double-sided roughening copper foil 9 was stuck the field which counters prepreg 3, and is allotted. This pressed object 5 is inserted between the mirror plane plates 6 which accomplish a pair, two or more sets of the pressed object 5 pinched with the mirror plane plate 6 which accomplishes this pair are inserted between the heating plates of a pair, and they are for the temperature of 170 degrees C, and 80 minutes, and the pressure of 5kg/cm2. The impression during 5 minutes, and pressure of 40kg/cm2 It impressed for 75 minutes, heating pressing was performed, and the multilayer board of six layers was obtained.
[0027] The productivity of the example 1 of a comparison and the cost of the outer layer core material 2 were evaluated for the above-mentioned example 1 - the example 2 as 100, respectively. Moreover, the gouge percent defective was measured by the visual inspection, and the obtained multilayer board of six layers was described in Table 1.
[0028]
[Table 1]

	実施例1	実施例2	比較例1
生産性 (比較例を１００とする)	120	125	100
打こん不良率 [%]	1.53	0.63	1.06
外層コア材コスト (比較例を１００とする)	85	85	100

As shown in the result of Table 1, in an example 1 and the example 2, productivity becomes 120% and the cost of the outer layer core material 2 can form at 85%.
[0029] Moreover, as shown in an example 2, it has checked mitigating a gouge percent defective by using covering copper foil. Moreover, by making the roughening side of covering copper foil into a multilayer board side in this way, this covering copper foil can paste up with a multilayer board, and can protect the circuit pattern 4 of the outermost layer to the appearance processing process of cutting a perimeter.
[0030] Moreover, since the whole surface is covered by covering copper foil in case radioparency equipment is used and the inner layer circuit pattern 4 is measured and checked, the reflective component and transparency component of an X-ray can be made into homogeneity all over a multilayer board, and there are few errors and they can obtain a reliable measurement result.
[0031]
[Effect of the Invention] According to the manufacture approach of the multilayer board of this invention, a inner layer circuit, the inner layer core material which oxidized the becoming circuit pattern, and the outer layer core material which oxidized the surface circuit pattern are formed. Since outer layer core material is used as a pressed object in piles through the prepreg of this inner layer core material which sank the resin varnish into the base material up and down, heating pressing of this pressed object is pinched and carried out with a mirror plane plate and a multilayer board is formed It becomes possible, and forming outer layer core material the same with forming inner layer core material can form inner layer core material and outer layer core material easily, it can improve productivity, and mitigation of cost can be aimed at further. Moreover, in case heating pressing of the multilayer board is carried out, by inserting covering copper foil between the pressed objects and mirror plane plates which form a multilayer board, generating of the poor ** contest by the resin powder which disperses from an end face can be prevented, and a percent defective can be mitigated.

[Translation done.]

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審査請求　未請求　請求項の数３　ＯＬ　（全　４　頁）

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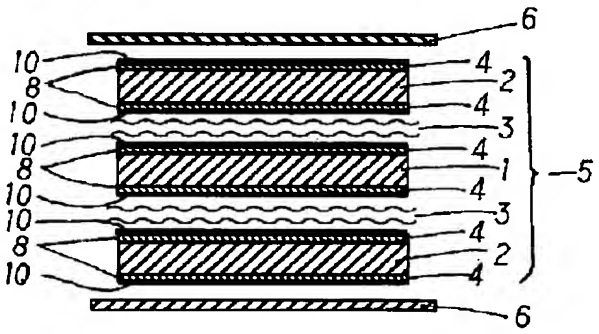
(54)【発明の名称】　多層板の製造方法

(57)【要約】

【目的】　内層コア材及び外層コア材を用いて多層板を容易に且つ効率よく製造することができる多層板の製造方法を提供することにある。

【構成】　本発明の多層板の製造方法は、酸化処理された内層コア材の上下に、基材に樹脂ワニスを含浸したプリプレグを介して酸化処理された外層コア材を重ねて被圧体とし、この被圧体を鏡面板の間に挟み、加熱加圧成形して多層板を形成することを特徴とする。



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【特許請求の範囲】

【請求項１】　内層回路となる回路パターン４を酸化処理した内層コア材１と表面の回路パターン４を酸化処理した外層コア材２を形成し、この内層コア材１の上下に基材に樹脂ワニスを含浸したプリプレグ３を介して外層コア材２を重ねて被圧体５とし、この被圧体５を鏡面板６で挟持して、加熱加圧成形して多層板を形成することを特徴とする多層板の製造方法。

【請求項２】　上記請求項１記載の加熱加圧成形の際に、被圧体５と鏡面板６との間にカバーシート７を挿入して加熱加圧成形することを特徴とする多層板の製造方法。

【請求項３】　上記請求項２記載のカバーシート７が銅箔で、被圧体５に面する側に粗化面を配して加熱加圧成形することを特徴とする多層板の製造方法。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、内層コア材及び外層コア材を使用した多層板の製造方法に関するものである。

【０００２】

【従来の技術】従来、多層板はインピーダンスコントロール、最外絶縁厚み公差等、板厚に係わる要求が厳しくなっている。そのため、多層化を図る際に所望の板厚を得るための１つの方法として、より多くのコア材を使用して板厚の精度を確保する多層板の製造方法が行われてきた。

【０００３】この多層板の製造方法としては、図３に示す層構成を有するものがあった。この図２は、従来の６層からなる多層板の製造方法を説明するための層構成を示す断面図である。この図を利用して従来の多層板の製造方法を説明する。

【０００４】まず初めに、例えば、両面銅張積層板に信号層パターン、電源層パターン、グランドパターン等の各所定のパターンを形成して内層コア材１を形成する。また、両面銅張積層板の片面に信号層パターン、電源層パターン、グランドパターン等の所定の回路パターン４を形成して外層コア材２を形成する。

【０００５】次に、上記表裏に回路パターン４が形成された内層コア材１の上下に、たとえばガラス布などの基材にエポキシ樹脂などの樹脂ワニスを含浸したプリプレグ３を所要枚数重ねるとともに、外層コア材２をその両側に重ね、これを加熱加圧成形することによって多層板を得ている。

【０００６】この多層板の製造方法において、内層コア材１は片面粗化銅箔８が使用されているが、プリプレグ３との接着強度を高めるために、この片面粗化銅箔８の回路パターン４が形成された表面を酸化処理により酸化処理面１０を形成し表面を粗化している。また、外層コア材２は最外層となる銅箔には片面粗化銅箔８を使用し、内層コア材１側にはプリプレグ３との接着強度を高

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めるために両面粗化銅箔９を使用している。

【０００７】ところが、この両面粗化銅箔９は片面粗化銅箔８に比べてコストが高く、表面が保護処理されていないので取扱に手間がかかっていた。つまり、この粗化面は光沢面に比べ酸化し易いため、ラミネート及び回路形成の際、表面の酸化物を取り除く、酸洗いを実施していた。

【０００８】

【発明が解決しようとする課題】本発明は上記の問題を鑑みてなされたもので、その目的とするところは、内層コア材及び外層コア材を用いて多層板を容易に且つ効率よく製造することができる多層板の製造方法を提供することにある。

【０００９】

【課題を解決するための手段】本発明の請求項１に係る多層板の製造方法は、酸化処理された内層コア材１の上下に、基材に樹脂ワニスを含浸したプリプレグ３を介して酸化処理された外層コア材２を重ねて被圧体５とし、この被圧体５を鏡面板６の間に挟み、加熱加圧成形して多層板を形成することを特徴とする。

【００１０】また、本発明の請求項２に係る多層板の製造方法は、上記請求項１の加熱加圧成形の際に、被圧体５と鏡面板６との間にカバーシート７を挿入し、加熱加圧成形することを特徴とする。

【００１１】また、本発明の請求項３に係る多層板の製造方法は、上記請求項２で使用されるカバーシート７が銅箔で、被圧体５に面する側に粗化面を配して加熱加圧成形することを特徴とする。

【００１２】

【作用】本発明に係る多層板の製造方法によると、表面を酸化処理して得られた内層コア材と外層コア材をプリプレグを介して重ね合わせて被圧体とし、この被圧体を鏡面板の間に挟み、加熱加圧成形して多層板を形成するので、コア材の表面に同種の銅箔を貼着して、同じ加工工程で内層コア材及び外層コア材を形成することができる。また、上記被圧体を加熱加圧成形するので、内層コア材と外層コア材を同様にして形成することができる。

【００１３】また、加熱加圧成形の際に、被圧体と鏡面板との間にカバーシートを挿入することにより、プリプレグやコア材の端面より飛散するレジン粉の最外層への付着を防止することができる。このカバーシートは、耐熱性に優れたものが使用され、トリアセテート樹脂やポリフッ化ビニル樹脂等の樹脂で形成された離形シート、又は、銅やアルミニウム等で形成された金属箔が使用される。

【００１４】また、上記カバーシートが銅箔で、被圧体に面する側に粗化面を配して加熱加圧成形することにより、加熱加圧成形によりプリプレグより流出した樹脂がこの銅箔の粗化面に付着し、多層板と銅箔を一体化することができる。

【００１５】本発明で使用される外層コア材は、内層コア材を形成する方法と同様にして形成されるもので、所要枚数のプリプレグを重ね合わせ、その上下に銅箔を配して加熱加圧成形し、得られた積層板の表面をエッチング処理して回路を形成することにより得ることができる。さらに、この積層板の表面の銅箔を酸化処理することにより多層板の材料として使用することができる。

【００１６】上記銅箔には電解銅箔の片面粗化銅箔が使用され、コア材を形成する際にプリプレグに対向する面に粗化面、外側に光沢面を配して貼着されている。

【００１７】また上記酸化処理としては、ブラウンオキサイド処理、ブラックオキサイド処理（黒化処理）等の化学処理が施される。この酸化処理で形成された酸化処理面は、内層コア材、及び外層コア材のプリプレグに相対する面に形成されるものはプリプレグとの接着強度を増すために、また、多層板の最外層に配せられるものは、多層板を形成したのち除去される。

【００１８】以下、本発明を一実施例について詳細に説明する。

【００１９】

【実施例】

実施例１

厚さ１００μｍのガラス布の基材（日東紡社製：ＷＥＡ１１６Ｅ）にエポキシ樹脂を含浸し、乾燥して樹脂が半硬化したプリプレグ３を２枚重ね合わせ、さらに、その両側に７０μｍの片面粗化銅箔８を重ね合わせて鏡面板間に挟み、一対の熱盤間に配し、温度１８０℃、圧力４０ｋｇ／ｃｍ^2 で９０分加熱加圧して、厚さ０．２mmの両面銅張積層板を得た。

【００２０】さらに、この両面銅張積層板をエッチング処理を施して回路パターン４を形成し、この回路パターン４に黒化処理を施して酸化処理面１０を形成し、内層コア材１、及び、外層コア材２を形成した。

【００２１】そして、図１に示す如く、得られた内層コア材１の上下に厚さ０．１５mmの上記プリプレグ３を複数枚重ね、さらに、外層コア材２をその外側にそれぞれ重ね合わせた被圧体５を、対を成す鏡面板６の間に挟み、この対を成す鏡面板６で挟持した被圧体５の複数組を一対の熱盤間に挟んで、温度１７０℃、８０分間、圧力５ｋｇ／ｃｍ^2 で５分間印加、圧力４０ｋｇ／ｃｍ^2 で７５分間印加して加熱加圧成形を行い６層の多層板を得た。

【００２２】実施例２

上記実施例１と同様にして、両面銅張積層板形成し、さらに、この両面銅張積層板をエッチング処理を施して回路パターン４を形成し、この回路パターン４に黒化処理を施して酸化処理面１０を形成して内層コア材１、及び、外層コア材２を形成した。

【００２３】そして、図２に示す如く、得られた内層コア材１の上下に厚さ０．１５mmの上記プリプレグ３を複数枚重ね、さらに、外層コア材２をその外側にそれぞれ重ね合わせた被圧体５を形成し、この被圧体５の上下にカバー銅箔７ａを重ね合わせ、対を成す鏡面板６の間に挟み、この対を成す鏡面板６で挟持した被圧体５の複数組を一対の熱盤間に挟んで、温度１７０℃、８０分間、圧力５ｋｇ／ｃｍ^{2}で５分間印加、圧力４０ｋｇ／ｃｍ^2 で７５分間印加して加熱加圧成形を行い６層の多層板を得た。

【００２４】比較例１

実施例１と同様にして、厚さ０．２mmの両面銅張積層板を形成し、この両面銅張積層板にエッチング処理を施し、さらに、エッチング処理で形成された回路パターン４に黒化処理を施して信号回路及び電源回路、接地回路に酸化処理面１０を有する内層コア材１を形成した。

【００２５】また、プリプレグ３を２枚重ね合わせ、一方の面に７０μｍの片面粗化銅箔８、他方の面に７０μｍの両面粗化銅箔９を重ね合わせて鏡面板６の間に挟み、一対の熱盤間に配し、温度１８０℃、圧力４０ｋｇ／ｃｍ^2 で９０分加熱加圧して、厚さ０．２mmの両面銅張積層板を得た。

【００２６】そして、図３に示す如く、得られた内層コア材１の上下に厚さ０．１５mmの上記プリプレグ３を複数枚重ね、さらに、外層コア材２をその外側にそれぞれ重ね合わせた被圧体５を形成した。この外層コア材２は両面粗化銅箔９が貼着された面をプリプレグ３に対向する面にして配されている。この被圧体５を対を成す鏡面板６の間に挟み、この対を成す鏡面板６で挟持した被圧体５の複数組を一対の熱盤間に挟んで、温度１７０℃、８０分間、圧力５ｋｇ／ｃｍ^2 で５分間印加、圧力４０ｋｇ／ｃｍ^2 で７５分間印加して加熱加圧成形を行い６層の多層板を得た。

【００２７】上記実施例１～実施例２を、比較例１の生産性、及び、外層コア材２のコストをそれぞれ１００として評価した。また、得られた６層の多層板を目視検査により打こん不良率を測定し、表１に記した。

【００２８】

【表１】

	実施例１	実施例２	比較例１
生産性　（比較例を１００とする）	120	125	100
打こん不良率　［%］	1.53	0.63	1.06
外層コア材コスト（比較例を１００とする）	85	85	100

表１の結果に示す如く、実施例１及び実施例２では生産性が１２０%になり、外層コア材２のコストが８５%で

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形成することができる。

【００２９】また、実施例２に示す如く、カバー銅箔を使用することにより打こん不良率を軽減することが確認できた。また、このようにカバー銅箔の粗化面を多層板側にすることにより、このカバー銅箔が多層板と接着し、周囲を切断する外形加工工程まで最外層の回路パターン４を保護することができる。

【００３０】また、内層回路パターン４をＸ線透過装置を使用して計測、確認する際には、全面がカバー銅箔で覆われているので、Ｘ線の反射成分と透過成分を多層板の全面に均一にすることができ、誤差が少なく、信頼性の高い計測結果を得ることができる。

【００３１】

【発明の効果】本発明の多層板の製造方法によると、内層回路となる回路パターンを酸化処理した内層コア材と表面の回路パターンを酸化処理した外層コア材を形成し、この内層コア材の上下に基材に樹脂ワニスを含浸したプリプレグを介して外層コア材を重ねて被圧体とし、この被圧体を鏡面板で挟持して、加熱加圧成形して多層板を形成するので、内層コア材を形成するのと同様にして外層コア材を形成する事が可能になり、容易に内層コア材及び外層コア材を形成して生産性を向上することができ、さらに、コストの軽減を図ることができる。また、多層板を加熱加圧成形する際に、多層板を形成する被圧体と鏡面板との間にカバー銅箔を挿入することにより、端面より飛散するレジン粉による打コン不良の発生を防ぎ、不良率を軽減することができる。

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【図面の簡単な説明】

【図１】本発明に係る多層板の製造方法の一実施例を示す多層板の層構成を示す断面図である。

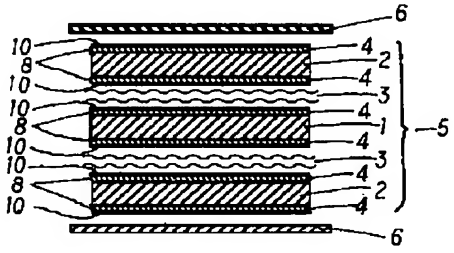
【図２】本発明に係る多層板の製造方法の他の一実施例を示す多層板の層構成を示す断面図である。

【図３】従来の多層板の製造方法を示す多層板の層構成を示す断面図である。

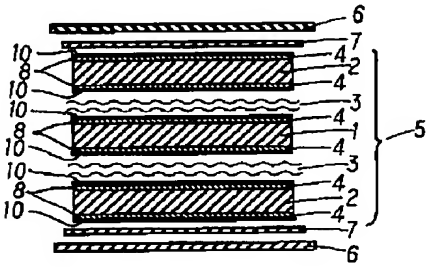
【符号の説明】

１　内層コア材
２　外層コア材
３　プリプレグ
４　回路パターン
５　被圧体
６　鏡面板
７　カバーシート
８　片面粗化銅箔
９　両面粗化銅箔
１０　酸化処理面

【図１】



【図２】



【図３】